THE AMERICAN
JOURNAL OF PHARMACY

MARCH, 1901.

THE CHEMISTRY OF IPECACUANHA.

By Dr. B. H. Paul and A. J. Cownley.

(*Concluded from p. 66.*)

In our examination of the alkaloids of ipecacuanha the Brazilian variety was employed in the first instance. The extraction was carried out in the following manner, mainly to avoid any possible deleterious action on the alkaloids: A quantity of the drug was extracted with cold alcohol, the alcoholic percolate mixed with basic lead acetate, filtered, and the excess of lead removed with dilute sulphuric acid. The filtrate was neutralized and the alcohol distilled off. The clear solution was then agitated with ether and ammonia. That ether solution was next shaken out with weak sulphuric acid and the acidulated solution repeatedly shaken with caustic soda, in the presence of ether, until cephaeline, the base soluble in caustic alkali, had been completely separated. The base, insoluble in weak caustic alkali, was then converted into hydrochloride and the salt recrystallized from water. Finally, the base was precipitated by ammonia. In the examination of New Granada ipecacuanha the powdered drug was mixed with lime and extracted with amylic alcohol and the bases then separated as before described. In order to obtain the crystalline emetine hydrochloride more readily, cephaeline should be completely separated by treatment with caustic alkali. Cephaeline is obtained from the caustic soda liquor by neutralization with acid and then shaking out with ether and ammonia.

The third alkaloid, which we have named psychotrine, was obtained by extracting with chloroform, the ammoniacal liquid from which emetine and cephaeline had been separated by ether.

EMETINE.

Emetine is apparently an amorphous base and almost colorless. It melts at about 68° C., is strongly alkaline to litmus, and neutralizes acids completely. On exposure to light it becomes of a yellowish color. It is readily soluble in alcohol, ether, chloroform or benzine, but is only sparingly soluble in hot petroleum spirit or in water. On evaporation of any of these solutions emetine is left in the form of a transparent varnish. Emetine is insoluble in solutions of caustic alkali, and is thus distinguishable from cephaeline.

Analysis of the base, emetine, which had been prepared from the crystalline emetine hydrochloride by precipitation with ammonia, gave the following results. These results correspond very closely with those obtained by Glènard and with the formula $C_{15}H_{22}NO_2 = 248$ or $C_{30}H_{44}N_2O_4 = 496$.

	1.	2.	Mean.	Theory.
Carbon	72·23	71·80	72·01	72·58
Hydrogen	8·71	9·02	8·86	8·87
Nitrogen	—	5·75	5·75	5·64
Oxygen	—	—	13·38	12·91
			100·	100·

The platinochloride was obtained as a buff-colored amorphous precipitate, almost insoluble in water or alcohol. It was dried until constant at 100° C., being partially decomposed at 120° C. On analysis ·208 gramme gave ·045 gramme platinum = 21·63 per cent. Calculated for $(C_{15}H_{22}NO_2)_2PtCl_4 2HCl = 21·53$ per cent. Molecular weight of the platinum salt, 905·7.

On titrating emetine with hydrochloric acid it was found to require for neutralization 14·56 per cent. HCl; this result corresponds with 12·71 per cent. in the hydrochloride, the calculated quantity being 12·83 per cent., agreeing with the formula $C_{15}H_{22}NO_2HCl$ or $C_{30}H_{44}N_2O_4.2HCl$.

The saturating power of the base is, of course, the same whether emetine is expressed as monovalent $C_{15}H_{22}NO_2 = 248$, according to Glènard, or bivalent with the formula $C_{30}H_{44}N_2O_4 = 496$, as in either case 248 parts of emetine are equal to 36·5 parts HCl or 496 parts to 98 parts H_2SO_4, respectively.

Emetine hydrochloride may be obtained in a crystalline form by evaporating a water solution slowly or by adding ether to an alcoholic solution. From water the salt crystallizes in radiating groups

of silky filaments, which are very readily soluble in water. The hydrochloride is rendered anhydrous at 100° C. The dried salt on analysis gave 12·91 per cent. HCl. Calculated for $C_{15}H_{22}NO_2HCl$ or $C_{30}H_{44}N_2O_4.2HCl$, requires 12·83 per cent. HCl.

The salt crystallizes with greater facility in the presence of an excess of acid. On adding moderately strong hydrochloric acid to emetine it is immediately converted into a bulky mass of fine silky crystals, whereas the formation of crystals from a neutral aqueous solution of the salt does not take place when the solution is dilute until some time has elapsed and the solution has become concentrated. This difference of behavior suggested the possibility that an acid salt was formed, but, on analysis of the silky mass of crystals formed on adding strong acid to the base, that was not found to be the case. Considerable difficulty was found in obtaining the crystals which separated from an acid solution in a fit state for analysis on account of the large quantity of mother liquor absorbed by the crystals. Drying by heat gave a neutral salt containing 12·83 per cent. HCl as required by theory. Analysis of the crystals well pressed on bibulous paper showed that no acid salt is formed, but that the presence of free hydrochloric acid merely promotes the crystallization of the neutral salt. The following results were obtained with the material thus imperfectly dried:

	Found.	Calculated for $C_{15}H_{22}NO_2.HCl.3H_2O$ or $C_{30}H_{44}N_2O_4.2HCl.6H_2O$.
Emetine	67·62	73·26
HCl	12·79	10·78
Water	19·59	15·96
	100·	100·

The amount of hydrochloric acid in a dry acid salt having the composition $C_{15}H_{22}NO_2.2HCl$ or $C_{30}H_{44}N_2O_4.4HCl$ would be 22·74 per cent.

Emetine Hydrobromide.—This salt can be obtained by adding potassium bromide to a solution of emetine hydrochloride or by neutralizing the base with hydrobromic acid. It crystallizes in tufts of silky needles. Emetine hydrobromide is now prepared on a commercial scale, and a sample supplied to us by Mr. W. G. Whiffen gave on analysis the following results:

	EmHBr. Commercial Crystalline.	Anhydrous.	Calculated for $C_{15}H_{22}NO_2.HBr$ or $C_{30}H_{44}N_2O_4.2HBr$. Anhydrous.
Emetine	66.90	75.25	75.38
Hydrobromic acid	22.01	24.75	24.62
Water	11.09	—	—
	100.	100.	100.

The commercial salt appears to approximate to a salt having the following composition:

Emetine	67.95
HBr	22.19
Water	9.86
	100.

which corresponds with the formula $C_{15}H_{22}NO_2HBr.2H_2O$ or $C_{30}H_{44}N_2O_4.2HBr.4H_2O$.

Emetine hydrobromide becomes anhydrous at 100° C., and the crystalline salt effloresces on exposure to air, until it has the composition approximating to a salt with the above composition, when it remains constant. It is a permanent salt, undergoing no alteration in color after being kept for some months. It is readily soluble in water, but much less so than emetine hydrochloride, difficultly soluble in absolute alcohol or in chloroform.

Emetine hydriodide was obtained in the form of silky needles by slow evaporation of its alcoholic solutions, and the nitrate in crystalline tufts by dissolving the nitrate in alcohol and adding ether.

The mercury salt was obtained in granular crystals, which melt to a resin in hot water on adding mercuric chloride to emetine hydrochloride. The chromate, picrate, ferricyanide and the gold salt have also been obtained. The sulphate, acetate and oxalate are very soluble in water or alcohol, and apparently uncrystallizable.

CEPHAELINE.

This base, when precipitated from a solution of its salts by ammonia, is colorless; but, like emetine, it soon acquires a yellow color on exposure to light. It is very much less soluble in ether than emetine and is very sparingly soluble in cold petroleum spirit, but with the aid of heat is more freely dissolved, and on cooling the solution is again deposited in a flocculent form. On evaporation of a solution

of cephaeline in alcohol, ether or petroleum spirit, the base is left in the form of a faintly yellowish transparent varnish. From ether cephaeline separates in the form of bunches of delicate silky needles which form more readily in the presence of water. It is readily obtained in a crystalline form by agitating a salt of cephaeline with ether and ammonia, when cephaeline crystallizes out almost immediately. Cephaeline precipitated by ammonia melts at about 102° C. The crystals from ether melt in a capillary tube at 96°–98° C. On exposure of the crystals to a temperature of 100° C. there is a loss of weight amounting to 4·78 per cent.; at 120° C. there is no further loss in weight, but the base acquires a brown color without melting and evidently undergoes some alteration which has not yet been studied.

Cephaeline is soluble in dilute caustic alkali and is thus readily separated from emetine.

Analysis of the anhydrous base gave the following results, which correspond with the formula $C_{14}H_{20}NO_2 = 234$ or $C_{28}H_{40}N_2O_4 = 468$:

		Calculated.
Carbon	71·28	71·79
Hydrogen	8·69	8·54
Nitrogen	6·24	5·94
Oxygen	13·79	13·73
	100·	100·

On titrating the base it was found to require for neutralization 15·66 and 15·67 per cent. HCl, the calculated quantity for the above formula as monovalent $C_{14}H_{20}NO_2$ or as bivalent $C_{28}H_{40}N_2O_4$ being 15·59. The mean of these results would give 13·54 per cent. of HCl in the salt as against 13·49 per cent. calculated.

The platinochloride is yellow and decidedly darker in color than the corresponding salt of emetine. On analysis it gave 22·38 per cent. of platinum, the calculated quantity for the formula $(C_{14}H_{20}NO_2)_2.PtCl_4.2HCl$, molecular weight 878, being 22·21 per cent. platinum.

Cephaeline Hydrochloride.—Cephaeline, like emetine, forms the crystalline hydrochloride with greater facility in the presence of excess of acid. It crystallizes in fine transparent rhombic crystals and has the composition represented by the formula

$$C_{14}H_{20}NO_2.HCl\,3H_2O \text{ or } C_{28}H_{40}N_2O_4\,2HCl,6H_2O$$

PSYCHOTRINE.

This alkaloid exists in ipecacuanha in very small amount, relatively, to emetine and cephaeline, and it differs from those alkaloids in being very sparingly soluble in ether. As previously mentioned, it is obtained by extracting with chloroform the ammoniacal liquid from which emetine and cephaeline had been previously extracted by ether. The quantity obtained was too small to allow of complete examination, but the physical characters of psychotrine distinguish it in a very definite manner. It is a crystalline alkaloid which separates from ether in well-defined transparent prisms of a pale lemon yellow color. It melts at about 138° C., neutralizes acids, and apparently has a much higher molecular weight than either emetine or cephaeline. Psychotrine dissolves readily in alcohol or chloroform, the solutions becoming dark-colored on exposure to light and depositing a dark brown substance.

In order to obtain more precise information as to the molecular weight of emetine and cephaeline than is given by the analysis of their platinum salts, we carried out many experiments for that purpose, employing Beckmann's boiling point method.

In dealing with emetine and cephaeline there are several difficulties to be overcome in order to accurately ascertain the rise in the boiling point of the solvent as the basis of the molecular weight determination. Sakurai, Landsberger and others have suggested modifications of Beckmann's process in order to obviate the variations peculiar to it; but in dealing with emetine and cephaeline there is difficulty in obtaining the solvent that shall have no action on the alkaloid at the boiling point of the solvent. Ether is the only solvent for emetine and cephaeline that we have found to allow the solution of the alkaloid to be boiled without decomposition of the alkaloid as judged by the change in color. Ether, however, has the great disadvantage that when in a dry condition it does not readily dissolve these alkaloids. When emetine and cephaeline are liberated in a nascent condition they are readily dissolved by ether in the presence of water, but that is not the case when the dry base is added to perfectly dry ether. Dry chloroform and absolute alcohol readily dissolve these bases, but judging from the intense darkening of the solutions and separation of flocculent matter after boiling, there is an apparent alteration. Trustworthy results with ether could only be obtained by employing the modification of the

method suggested by Sakurai,[1] of weighing the solvent after noting the rise in temperature and ascertaining the amount of alkaloid dissolved in the ascertained quantity of the solvent.

The results obtained by Beckmann's method were as follows:

Emetine.		Molecular Weight. Mean.
	Ether as solvent.	
Molecular weight	(1) 249 319 283 294	286
	(2) 240 334 285	286
	Ethylic alcohol as solvent.	
	353 (1) 381 519 477	432
	(2) 484 527 547	519
	(3) 473 439 652	521
	Chloroform as solvent.	
	(1) 402	402
	(2) 469	469
Cephaeline.	**Ethylic alcohol as solvent.**	
	533 593	563

The figures 1, 2, 3 denote that there was a first, second and third addition of the alkaloid to the same solution. With the exception of ether, the solvents employed have, as already noted, a great color-changing action on the alkaloids. The simple expression of our analytical data gives the empirical formula for emetine as $C_{15}H_{22}NO_2 = 248$, and for cephaeline $C_{14}H_{20}NO_2 = 234$, in which case the figures have a monobasic value. The determination of the weight of the molecule as shown by the rise in boiling point when employing ethylic alcohol and chloroform as solvents, while not entirely satisfactory from the possibility of decomposition of the alkaloids having to some extent taken place, nevertheless points to the molecular formulæ and weights being for emetine $C_{30}H_{44}N_2O_4 = 496$, and for cephaeline $C_{28}H_{40}N_2O_4 = 468$. On this point, however, further information no doubt will be forthcoming from such results as may be obtained by a splitting up of the molecule.

It is satisfactory to be able to chronicle the fact that the results as above obtained in the investigation of the ipecacuanha alkaloids have been practically confirmed by so eminent an authority on alkaloids as Dr. Hesse, who kindly gave us the benefit of his valuable

[1] *Jour. Chem. Soc.*, LXI, 989.

assistance by examination of emetine and cephaeline;[1] as well as by E. Merck.[2]

Dr. Hesse's results as compared with our own are thus tabulated:

Emetine.	Paul and Cownley.	Hesse.	Calculated.	
			Paul and Cownley. $C_{16}H_{22}NO_3$ or $C_{30}H_{44}N_2O_4$.	Hesse. $C_{30}H_{42}N_2O_4$.
C	72·01	71·99	72·58	72 87
H	8·86	8·12	8·87	8·50
N	5·75	—	5·64	5·66
Platinum	21·63	21·67	21·52	21·56
Cephaeline.			$C_{14}H_{20}NO_3$ or $C_{28}H_{40}N_2O_4$.	$C_{28}H_{38}N_2O_4$.
C	71·28	71·84	71·79	72·10
H	8·69	8·11	8·54	8·15
N	6·24	—	5·94	6·00
Platinum	22·38	22·40	22·21	22·24

In other words, then, these results agree so closely that our formulæ for the two bases may be accepted as correct if we assign to each the formula respectively as, emetine, $C_{30}H_{44}N_2O_4$, and cephaeline, $C_{28}H_{40}N_2O_4$, as will be seen by the following molecular weights:

	Emetine.	Cephaeline.
Paul and Cownley	248 x 2 = 496	234 x 2 = 468
Hesse	494	466

THE PHARMACOLOGY OF EMETINE AND CEPHAELINE.

Dr. R. B. Wild, Lecturer on Materia Medica and Therapeutics at Owens College and the Victoria University, Manchester, has kindly carried out the experimental investigation of the comparative action of emetine and cephaeline upon certain tissues and organs, in the pharmacological laboratory of the Owens College. The results obtained afford some information as to the relative activity of these bases and give some indications of their therapeutic value.[3] The hydrochlorides of the bases were respectively employed. It was found that emetine and cephaeline both possess powerful emetic action; but the emetic dose of emetine was double that of cephaeline; on the other hand, the nausea produced by cephaeline

[1] *Pharm. Journ.*, LXI, 98.
[2] *Berichte*, 1894, 50.
[3] *The Lancet*, Nov. 23, 1895.

is double that of emetine. For therapeutic use it seems probable that in cephaeline we have a powerful and certain emetic in doses of 5 to 10 milligrammes. In acute catarrh and fever, where vomiting is not required, emetine in small doses seems likely to prove of considerable value, and as an emetic in doses of 10 to 20 milligrammes when a more depressing action is required. In other words, then, emetine is a good expectorant, but cephaeline not quite its equal, while cephaeline is undoubtedly superior as an emetic.

BRAZILIAN AND COLUMBIAN IPECACUANHA.

The observations of Dr. Wild are of importance as indicating that ipecacuanha for pharmaceutical purposes must be regarded from the nature and the amount of emetine and cephaeline rather than from its botanical source.

The results of analyses of selected samples of the two kinds of ipecacuanha show that although the total amount of alkaloid in the two kinds does not differ materially, the proportions of emetine and cephaeline are so different that the drugs cannot be regarded as interchangeable.

This is apparent from the following analyses:

	Brazilian.		Columbian.
	Root.	Stem.	
	Per cent.	Per cent.	Per cent.
Emetine	1·45	1·18	0·89
Cephaeline	·52	·59	1·25
Psychotrine	·04	·03	0·06
	2·01	1·80	2·20

This difference is made clearer from the following percentage composition:

	Brazilian.		Columbian.
	Root.	Stem.	
Emetine	72·14	65·6	40·5
Cephaeline	25·87	32·8	56·8
Psychotrine	1·99	1·6	2·7
	100·	100·	100·

The method of analysis adopted consists in taking 50 grammes of the root, mixing with one-fifth of its weight of lime, moistening with water and then extracting with amylic alcohol. The amylic percolate is extracted with dilute acid, and the acid liquid shaken out with ether and ammonia to extract the emetine and cephaeline, leaving psychotrine to be extracted by chloroform from the ammoniacal liquid. The ether residue, consisting of emetine and cephaeline, is then titrated with semi-normal hydrochloric acid, of which 1 c.c. = 0·124 gramme emetine and 0·117 gramme cephaeline. Emetine and cephaeline are then separated by treating the hydrochloric acid solution with caustic soda in the presence of ether and repeatedly shaking the ether solution with soda until all the cephaeline has been separated. The ether solution of emetine is evaporated and the residue titrated with standard acid, the result being expressed as emetine. The soda liquor is acidified, shaken with ether and ammonia, and the ether residue of cephaeline titrated as with emetine. The total number of cubic centimetres of semi-normal hydrochloric acid used in titrating the separated bases, emetine and cephaeline, should equal the number required before their separation. When the separation has been satisfactorily made, the emetine hydrochloride should be readily obtained in a crystalline form on evaporating the solution, and the solution of cephaeline hydrochloride should give the characteristic crystals of cephaeline when shaken with ether and ammonia.

The statements made by some observers, that ipecacuanha root which has been deprived of its alkaloids has a greater therapeutic value in the treatment of dysentery, require to be received with doubt, inasmuch as the so-called de-emetinized ipecacuanha has not been found in our experience to be entirely free from alkaloidal contents. In fact, as much as 0·5 per cent. of total alkaloids is not uncommon. Some attempt, however, was made to isolate and study another constituent of ipecacuanha from the basic lead precipitate previously mentioned as obtained in our separation of the basic constituents. A crystalline constituent was obtained of the nature of a glucoside somewhat resembling saponin. It had no emetic action in doses of 0·25 gramme.

LABORATORY, 13 FENCHURCH AVENUE, LONDON, E. C.

A NEW COLD CREAM.

By William C. Alpers, Sc.D.

In proposing a formula for a new cold cream, I beg to apologize in advance if what I am going to say is not new to you. In these days of continuous research by thousands of ambitious, restless minds, we are never sure that some one else has not long ago discovered what we consider as new. The only safeguard against such repetition consists in the diligent reading of pharmaceutical and chemical journals, and here I must confess to a sin of omission; for the pressure of business during the last two years has not left me time enough to do my full duty in this respect.

The words "cold cream" have a double meaning. As a preparation of the Pharmacopœia, the synonym of Unguentum Aquæ Rosæ, its formula is, of course, definite and fixed, and no ointment, however superior, can be dispensed in its place. But, besides this Pharmacopœial meaning, cold cream is a collective name for all unctious preparations that serve as an emollient for the skin, and the laity, when asking for cold cream, care but little whether the ointment that they receive is made after one formula or another, as long as it is soft and soothing, of grateful odor and desired efficiency. We all know that the official preparation, while fulfilling all these requirements when freshly made, cannot be depended upon after only a short time, particularly when exposed to a sudden change of temperature. In pharmacies where the sale of toilet articles is made a special feature, the official cold cream is entirely unavailable; for when put up in sealed packages, we never know in what condition it may be when sold. For this reason nearly every enterprising pharmacist has his private formula, differing more or less from the official one, and it may be stated without fear of contradiction that none of the numerous proprietary cold creams are made in accordance with the Pharmacopœia. It is for such a preparation, uniform in all climates and available under all conditions, that I propose this new formula. The disturbing element in the official preparation being the oil, a proper substitute was found in the so-called paraffin oil, also sold under the name of mineral oil or white oil. Care must be taken to select the best quality, entirely free from odor and color.

The formula is as follows:

White wax	150 parts.
Paraffin oil	600 "
Water	240 "
Borax	9 "
Oil geranium	1 "
Oil rose, 10 to 20 drops	
To make	1,000 parts.

Dissolve the wax in the oil with the aid of a gentle heat; in another vessel dissolve the borax in the water; bring both solutions to the same temperature, not exceeding 60° C. (140° F.), and pour the aqueous solution into the oil in a continuous stream. Stir gently for a minute or two, add the essential oils while stirring, and pour into jars before cold.

This preparation is a snow white, soft and smooth ointment of glossy appearance and pleasant odor, far surpassing in elegance the official cold cream. The time to prepare it is less than fifteen minutes. It will keep in the heat of summer and the cold of winter, becoming but slightly thinner in summer. From the testimony of those that have used this preparation, it is fully equal, if not superior, to any other cold cream, rendering the skin soft and white and exercising a soothing influence on irritated surfaces, chapped hands and lips. The cost is much less than that of the official cold cream.

In preparing this ointment a few points must be carefully observed. Do not overheat your solutions; if too hot, a much inferior preparation will result. Let both solutions be of the same temperature; for this reason I use a chemical thermometer as a stirring rod. Be careful to wipe the stirring rod (or thermometer) each time when you move it from one solution to the other. Do not stir very briskly after mixing the two solutions. Be sure of the purity of the wax; do not take a mixture of paraffin and wax which is sold often as white wax and foolishly preferred by some on account of its greater whiteness.

Instead of plain water, rose water, or water with any desired odor may be used, omitting the oils afterwards, or other fragrant oils may be substituted for the essential oils. The quantities of oil and wax may also be varied to produce an ointment of different consistency.

The most remarkable feature of this cold cream is the fact that it

changes its consistency but slightly in various temperatures, and never loses its grateful odor and elegant appearance. This quality was certainly imparted by the use of the mineral oil, and the thought naturally suggested itself to use this oil also in other ointments with the view of making them more stable and uniform. I intended to make a series of experiments in this direction, but lack of time during the last two years prevented me from carrying out my intention. I can only submit to you two samples, one of simple cerate in which 100 parts of lard have been replaced by the same quantity of mineral oil, and one of camphor cerate, in which the cotton-seed oil has been replaced by mineral oil. The former one, the simple cerate, prepared last July, has stood for a long time in direct sunlight without showing signs of granulation or decomposition. I trust that these few remarks may encourage others to take up this work, which seems to promise good results.

WHY DO SYRUPS SPOIL?

By Alfred I. Cohn, Ph.Gr., New York.

The reason why the syrups of the U. S. Pharmacopœia so frequently spoil is a question that has engaged the attention of many investigators. The spoiling has been ascribed to various causes, and almost as many means have been proposed for its avoidance; in fact, a search through the literature of pharmacy of the past decade or two will bring to light a striking variety of expedients adopted for preventing or retarding decomposition in Pharmacopœial syrups, not only individually, but collectively as well.

Among the causes which are prone to occasion deterioration in syrups, the following are the most prominent:

(1) Thinness of syrup, *i. e.*, insufficient sugar has been used, whereby the syrup obtained is not sufficiently dense.

(2) Constant or prolonged exposure to too high a temperature, as in a room heated too warmly; proximity to a heater, etc.

(3) The presence of substances prone to ferment, such as acacia, albumin, gelatin, pectinous matter, etc.

(4) Exposure to light, as in the case of syrups containing ferric salts.

(5) The presence of substances which are naturally inclined to be unstable, such as hydriodic acid, hypophosphites, etc.

(6) Fermentation due to the action of yeast or other microbic agents.

(7) Impurities in the sugar used in making the syrup, *e. g.*, ultramarine, etc.

On carefully examining these causes we find that, with the exception of one or two, perhaps, they are all practically under the control of the pharmacist, as we shall see.

It is a well-known fact that a syrup of proper density is far less prone to spoil, provided, of course, it be made from proper materials, than is a syrup made with insufficient sugar. On the other hand, a *too* concentrated syrup is just as likely to spoil as a weak syrup, because it is equally well known that a very concentrated syrup will deposit crystals of sugar, and, in so doing, will become weaker in sugar than if made with just sufficient sugar. In other words, the latter, in crystallizing out, leaves the syrup deficient in sugar. Hence it follows that a very concentrated syrup must not be kept in a place where the temperature is likely to fall much, otherwise the syrup, having deposited the excess of sugar, which it does not take up again without heating, becomes too thin and may thus readily spoil.

A constant or prolonged exposure to warmth is apt to be detrimental for practically the same reason as mentioned above. The warmth makes the syrup too thin, so to speak, and renders it subject to change.

The presence of easily fermentable substances and those readily prone to decompose cannot, of course, be avoided; hence it is all the more important that due regard be paid to the quality of the syrup used in order not to increase their tendency to decompose, but rather to prevent, or at least retard, decomposition as much as possible.

Exposure to light and the action of microbic agents are also easily avoided or prevented.

We now come to what is, perhaps, the most frequent and most mischievous of all the causes from which syrups spoil, and that is the impurities in the sugar from which the syrup is made.

Syrup made from sugar answering the requirements of the U.S.P. is a very stable preparation, if of proper density. Experience,

moreover, has shown such a syrup to be the best preservative of unstable chemicals, in the sense of its being able to prevent, or at least greatly retard, the decomposition to which such chemicals are prone. Nevertheless, substitutes for it have been proposed or highly recommended, among others the total or partial replacement of the syrup by glucose or glycerin, or even both. In certain syrups additional expedients have also been recommended, yet, in my experience, these substitutes and expedients are unnecessary; in fact, under certain circumstances, they are more likely to aggravate matters.

These substitutes and expedients have all been proposed or recommended, it is my belief, because the syrup as ordinarily made is not prepared from suitable materials. We are all accustomed to consider the sugar we usually buy as so perfectly fitted for every use in our daily domestic lives, that the thought is scarcely likely to occur to one that the spoiling of a syrup may be traced to the quality of the sugar used.

The pharmacist usually obtains his supply of sugar from the grocer; or he may, perhaps, in some instances buy it direct from the manufacturer by the barrel. In neither case, however, is he likely to receive a *pure* sugar, simply because pure sugar has naturally a yellowish color, to correct which the manufacturer adds some blue pigment, usually ultramarine blue, to "whiten" the sugar—just as the laundress blues her linen, and for a similar reason—and thus to render it more agreeable in appearance and hence more salable.

Ultramarine blue, however, is an exceedingly mischievous substance when present in Pharmacopœial syrups, and it is really the most frequent cause of the spoiling of the latter. The quantity of the pigment present in sugar is in no wise sufficient to affect the eligibility of sugar as a daily food, yet it is quite sufficient to cause the decomposition of easily decomposable chemicals. This will be evident if we consider how ultramarine blue is made, and what it is, chemically.

Ultramarine blue is prepared by heating together a mixture of fine white clay or silica with sodium carbonate, sulphur and charcoal; or, a mixture of kaolin, sodium sulphate, sodium carbonate, sulphur and charcoal. According to the proportions taken of the several ingredients, ultramarines of various colors may be obtained.

For instance, there may be prepared deep-blue, light-blue, violet-blue, green, white, violet, red, and also yellow ultramarines. All these pigments are of varying composition, and, using one and the same formula, it is exceedingly difficult, if not almost impossible, to secure uniform results, as the different lots are likely to exhibit varying shades and have different compositions. Hence no positive formula can be properly assigned to any one ultramarine.

According to some investigators, ultramarines are considered to be compounds of aluminum-sodium silicate with sodium sulphide; by others they are believed to be mixtures of aluminum silicate, sodium polysulphide, and sodium sulphate, sulphite, and hyposulphite; still others state them to be aluminum-sodium silicates in which a part of the oxygen is replaced by sulphur; again, many believe them to be compounds of aluminum-sodium silicate with aluminum sulphate.

Whichever of these views is taken, however, the broad fact stands out that an ultramarine is to all intents and purposes a sulphide; whether of aluminum, silicon or sodium makes little difference, so far as its relation to our subject is concerned. When it is also added that ultramarine blue is capable of effecting all the disturbances of which a readily-decomposable sulphide is capable, and that it is decomposed by all acids, even the weakest, as well as by acid salts, such as alum, for instance; when we consider that it is also decomposed by simply boiling (in syrup or water), we may apprehend what an important influence its presence may have in syrups containing salts inclined to be unstable.

The U S.P. demands that sugar be free from untramarine, yet it is probable that few pharmacists note this requirement with care, and fewer still are likely to test the sugar they buy to see that it is free from this pigment.

It would, therefore, appear expedient, in fact almost necessary, that a form of sugar be made official in the U.S.P. now under revision, which may always be depended upon as being absolutely free from all disturbing contaminations and impurities, and which shall yet be within the reach of every pharmacist.

The sugar which will best answer all requirements is white rock candy. This sugar, because obtained by crystallization, can always be depended upon as being free from ultramarine.

Attention having thus been called to the mischievous properties

possessed by ultramarine, it may readily be seen what reactions the pigment would effect in the individual syrups.

On allowing a simple syrup, made by the cold process, to stand for a while, a deposit forms, consisting of sulphur precipitated as a result of the decomposition of the ultramarine; sometimes the pigment itself is also deposited, particularly if a large quantity has been used in "whitening" the sugar. The syrup is then likely to acquire a rather disagreeable odor. If the syrup is made by boiling, the ultramarine, on continued boiling, is decomposed, and a blackish scum rises, which may be removed. A syrup made by boiling is, hence, apt to keep better than one not boiled.

In syrup of acacia, the calcium gummate and ultramarine react, a calcium sulphide being formed. The syrup, which is naturally prone to decompose even under the most favorable conditions of preservation, is thus made to deteriorate with increased rapidity.

In syrups of citric acid, calcium lactophosphate, lemon and squill, there are free acids present, sufficient to decompose the ultramarine and render the syrups unfit for use.

In syrup of hydriodic acid we have a naturally unstable chemical which requires all our art to properly preserve, and which must be particularly well protected from the action of reducers. With such a chemical, ultramarine immediately gives a reaction. The syrup soon develops a red color and becomes totally unfit for use. This syrup has been the subject of much experiment, with a view to finding means of rendering it more stable. Among these means there has been recommended the partial or total replacement of the sugar by glucose or glycerin. Glucose as ordinarily found on the market is unfit for this purpose, as it nearly always contains appreciable quantities of free sulphuric acid, and is, moreover, very prone to ferment. Glycerin is totally inadmissible, as it enters into chemical reaction with the hydriodic acid, the result being the formation of allyl iodide. The syrup soon develops a straw color which rapidly deepens, while the preparation acquires a disagreeable odor and taste which render the syrup unfit for use.

In syrup of ferrous iodide we have again a readily changeable iron salt, subjected in addition to the action of a sulphide. Naturally enough, ferrous sulphide forms, together with an unstable iodide from which free iodine is soon liberated. In this syrup glycerin would be a good preservative, were it not that pure syrup is very

much better. Glucose is inadmissible because of the reasons already stated. To fully appreciate what effect the presence of ultramarine has on this syrup, it is only necessary to boil a syrup made from ordinary sugar and one made from rock candy. That made with sugar turns brown when the boiling-point is approached, while that free from ultramarine may be boiled for a long time without impairing in any way the fine green tint of the syrup. It is true that the particles of superheated syrup adhering to the flask or evaporating dish above the surface of the liquid may carbonize and impart a color to the syrup when dissolved in the latter, but the color will not be due to decomposition of the syrup, as is the case when a sugar syrup has been used. If care be taken to avoid the solution of the carbonized particles, the boiling syrup retains its handsome brilliant green color. Nor is it necessary to keep any iron wire in a syrup so made, as recommended by some. The syrup may even be freely exposed, and does not require to be kept in well-filled bottles only, or in small, completely-filled bottles.

In the syrups containing hypophosphites, we have again readily changeable salts acted upon by a sulphide. The compound syrup of the N. F. in particular spoils rapidly if any ultramarine is present, whereas if absent the syrup keeps perfectly.

In syrups of senega, senna and rhubarb, we have polygalic acid, cathartic acid and chrysophanic acid present, respectively; in syrup of wild cherry, hydrocyanic and tannic acids; in syrup of blackberry root, tannic acid. In fact, an inspection of all Pharmacopœial syrups will show that there are but few which do not contain one or more constituents imcompatible with and fully able to decompose ultramarine blue.

To go a step further, syrups are valued adjuvants, and, next to water, are perhaps more largely prescribed than any other preparation. Syrups are thus brought into contact with every kind and variety of substance, a fact which in itself furnishes sufficient reason for insisting that a pigment-free syrup be made obligatory in the next Pharmacopœia by replacing the sugar by white rock candy.

It is true the initial expense of preparing such a syrup is greater than when sugar is used, because rock candy itself costs somewhat more than sugar, and because, since it contains more water of crystallization than does sugar, more of it must be used to obtain a syrup of proper density. Notwithstanding the greater first cost,

however, a syrup so made will be found cheaper in the end, if there be taken into account not only the time wasted, but also the pecuniary loss entailed by the necessity of throwing away the spoiled material.

THE ASSAY OF COCA.

By William R. Lamar.

Since the Committee of Revision chosen at the Eighth Decennial Convention for revising the United States Pharmacopœia, held in Washington, during the early part of May of last year, was instructed to append assay processes to as many of the potent drugs and their preparations as were found amenable to assay, where simplicity of process, both as to method and apparatus employed, would lead to fairly uniform results in the hands of different workers, it is reasonable therefore to expect that coca will receive due consideration at the hands of the committee, and the hope is entertained that it will find a place among those drugs finally selected for standardization.

Having frequent occasion to determine the alkaloidal content of this drug, it is thought that a description of the process in use in this laboratory, and one which has been found to give perfectly satisfactory results, might present some points of interest.

It is scarcely to be expected that much which is new or original can be said of any process likely to be put forward for the valuation of this or related drugs, inasmuch as the same general principle underlies them all.

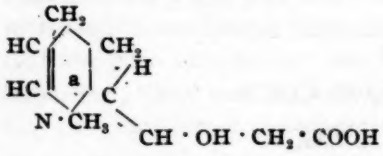
However, by calling attention to and emphasizing such points in the assay as have been found essential, results are easily obtained which are quite concordant and represent fully the value of the drug in question.

It is the writer's opinion that a lack of appreciation of the extreme instability of the alkaloids accompanying coca is, in the main, the cause of the many discordant results in the assays published of this drug.

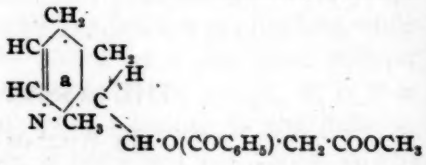
As is well known, cocaine, cinnamyl cocaine and isatropyl cocaine are all methyl esters of a differently substituted ecgonine molecule.

The relationship existing between these bodies can easily be seen from an inspection of the following structural formulæ:

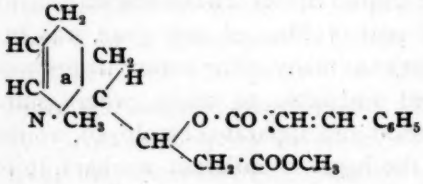
ECGONINE.



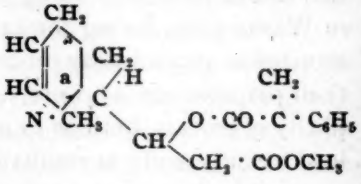
COCAINE.



CINNAMYL COCAINE.



ISATROPYL COCAINE.



It is the readiness with which the methyl group, attached to the carboxyl, is split off, forming, in the case of cocaine, a body, viz., benzoyl-ecgonine, which, although possessing alkaloidal property as regards its behavior to precipitants of such, is nevertheless virtually insoluble in most of the solvents (ether, chloroform, etc.) employed for abstracting the alkaloids from their solutions after rendering alkaline, that the discrepancy above referred to is most likely due.

This saponification occurs quite readily, both in alkaline and acid solutions, and slightly so in neutral solutions with the progress of time, but to a marked extent if there be much elevation of temperature.

Hence it is apparent that a large excess of alkali employed both in the liberation of the alkaloids from their existing combinations in the leaf, and their subsequent precipitation from the solution of their salts, prior to extracting and weighing, is to be especially avoided.

This excess is not only to be avoided, but the strength also of the alkali itself should be as low as is consistent with a complete liberation of the bases.

So also must the strength of acid employed for removing them from the menstruum used be carefully regulated.

The ideal menstruum to be employed in extracting any drug under assay is the one which, while completely removing in a reasonable length of time the alkaloids or other active principles contained therein, at the same time brings into solution the least possible amount of the objectionable, so-called extractive matter, which not infrequently occasions so much trouble in the subsequent steps of the process.

Such a menstruum is confidently believed to exist in the employment of kerosene oil for the exhaustion of coca.

The process about to be described is a modification of the well-known one of the late Dr. E. R. Squibb,[1] in which a dilute solution of ammonium hydrate is substituted for the solution of sodium carbonate employed to liberate the alkaloids from their natural combinations.

The ammonium hydrate appears to be more penetrating, probably due to its volatility, and for this reason it is favored.

The quantities employed and the method of procedure are as follows:

Coca in No. 40 powder	25 grammes.
Ammonic hydrate (2 per cent. NH_3)	25 c.c.
$\frac{N}{10}$ hydrochloric acid	75 c.c.
Ether, Kerosene oil	each a sufficient quantity.

Place the powdered leaf into an open vessel of suitable capacity (about 450 c.c.); a beaker, except for its fragility, answers very well. However, a covered jar, such as is commonly used for holding solid extracts, has been used to advantage, and in fact is rather to be preferred.

Now add to it 25 c.c. of an approximately 2 per cent. solution of ammonia and mix well together by means of a stout glass rod of such a length that, while in the jar, will just allow the cover to rest in its normal position; permit this to macerate for half an hour, stirring from time to time, the whole being well covered.

At the expiration of this time remove the cover and note whether or not the odor of ammonia is perceptible after stirring; if so,

[1] Ephemeris, Vol. III, p. 1104.

gradually add 75 c.c. of kerosene oil, stirring well after each addition.

After the whole has been intimately mixed, cover the jar and allow to further macerate for an hour or more, stirring at intervals of ten or fifteen minutes.

Transfer to a cylindrical percolator of 500 c.c. capacity (preferably of the Oldberg type) containing a plug of absorbent cotton firmly pressed into its throat; pack only slightly.

Remove the last portions of the leaf from the jar by means of oil delivered from a wash bottle, allowing this to pass through before covering with a fresh supply.

The percolation should proceed at the rate of six or eight drops per minute, collecting about 450 c.c. of percolate. If the process of percolation is carefully executed, a smaller quantity of percolate suffices; sometimes 250 to 300 c.c. are sufficient to accomplish a practical exhaustion of the leaf.

Transfer the percolate to a separatory funnel of 700–750 c.c. capacity of the Squibb pattern, and after rinsing the beaker used to receive the percolate, with small portions of oil, add to the contents of the separator 25 c.c. of $\frac{N}{10}$ hydrochloric acid and shake continuously for ten minutes.

Allow the separator to rest, when the separation will be almost completely effected in twenty minutes; draw off this acid liquid together with the slight amount of emulsion remaining at the line of contact of the two liquids into another separator of from 265–285 c.c. capacity.

Add to the oil remaining in the separator another portion of 25 c.c. $\frac{N}{10}$ hydrochloric acid, shaking and separating as just described, and finally the extraction is completed with a third portion of 25 c.c. $\frac{N}{10}$ hydrochloric acid.

To the united acid solutions of the alkaloids are now added 20 c.c. of ether and the whole well shaken together. After carefully releasing the pressure, the liquids are allowed to separate, the acid liquid is then drawn off into a second separator of like capacity and to it is added a fresh portion of 15 c.c. of ether, the two well shaken together and allowed to separate completely, thus removing the last trace of oil and coloring matter.

The acid solution is now drawn off carefully into a third separator; the ether remaining in the first separator is shaken successively with two portions of water of 5 c.c. each; after separation has taken place, these in their turn are added to the second ether washing, and after shaking and allowing to separate, are drawn off into the third separator containing the major portion of the acid solution. To this is then added a sufficient quantity of ammonia water 10 per cent., previously diluted with four times its volume of water, to render the liquid slightly alkaline.

If the ammonia water used is of proper strength, then 6·64 c.c. of the dilution will be sufficient. However, in practice it usually requires from 8 to 9 c.c.

This method of procedure prevents an unnecessary excess of alkali which, as has been pointed out, exerts a saponifying effect upon the alkaloids, proportional to the degree of its concentration.

(To satisfy one's self of this fact, it is only necessary to add, say 5 c.c. of 10 per cent. ammonia water for the precipitation of the alkaloids, and to remove them by extracting with successive portions of ether, until this latter upon evaporation leaves no weighable residue.

If now, to a portion of the alkaline liquid remaining, a few drops of Mayer's reagent be added, an unmistakable evidence of the presence of benzoyl-ecgonine will be recognized.)

Extract now the alkaloids with three successive portions of ether, using respectively 40, 30, 30 c.c., taking care in each instance to allow the ether to separate completely, drawing off the aqueous liquid carefully into another separator, and pouring the ethereal solution of the alkaloids out through the upper opening of the separator into a tared beaker of 160 c.c. capacity.

Rinse the separator with 10 c.c. of ether, pouring it out at the top, into the separator containing the aqueous portion.

Now hold the separator from which the ethereal solution has just been removed, in the left hand, with the mouth of same inclined downward at an angle of about 45° with and over that of the separator containing the aqueous portion, and while rotating same, rinse the rim with 5 c.c. of ether delivered from a dropping tube in such a way that in falling it will drop into the separator beneath; in a similar manner rinse the cork stopper, and finally add to the

contents of the separator an additional 10 c.c. of ether, making in all 30 c.c. for the second extraction.

Shake the separator with its contents actively for a few moments, then allow the liquids to separate, drawing off the aqueous portion into the separator previously emptied, the ethereal layer being added to that already in the beaker.

This operation is repeated a third time.

The beaker containing the ethereal solution of the alkaloids is set in a warm place (30°–35° C.), and as soon as the ether has evaporated, it is dried at a temperature of 60° C. until of a constant weight, this usually requiring about three hours.

The weight obtained multiplied by four expresses the percentage of alkaloids in the leaf.

The alkaloids so obtained are almost colorless, possessing only a faint cream tint, and are beautifully crystalline in appearance.

If it is desired, as a check upon the weight, they may be titrated, using an excess of $\frac{N}{20}$ sulphuric acid V.S. (about 25 c.c.) and a few cubic centimetres of ether to facilitate the solution, and after the ether has been entirely dissipated, the excess of acid is determined by means of $\frac{N}{20}$ potassium hydrate V.S., using (2) two drops of a cochineal tincture (1 gramme in 25 c.c. of 25 per cent. alcohol).

The factor for the pure alkaloids as determined by numerous assays is 0·01514 gramme as the equivalent of 1 c.c. of $\frac{N}{20}$ H_2SO_4 V.S., the extremes being 0·01493–0·0155 gramme.

However, if the assay has been carefully conducted, this is entirely unnecessary, for the gravimetric result is in reality the more accurate, this being due not only to the difference in the molecular weights of the alkaloids, but also to the variable composition of this mixture.

The claim has been made by A. R. L. Dohme[1] that the so-called Keller method is far superior to all other methods for assaying coca, but as none of the methods employed in his comparison was similar to the one just described, it was thought advisable to institute such a comparison.

The following results speak for themselves:

---

[1] Proceedings Amer. Pharm. Assoc., 1895, 268.

	KELLER METHOD.				SQUIBB'S MODIFIED.			
	Weight of Alkaloids.	No. c.c. $\frac{N}{20}$ H_2SO_4 V.S. required.	Equivalent of 1 c.c. $\frac{N}{20}$ H_2SO_4 V.S.	Percentage of alkaloids by weight.	Weight of Alkaloids.	No. c.c. $\frac{N}{20}$ H_2SO_4 V.S. required.	Equivalent of 1 c.c. $\frac{N}{20}$ H_2SO_4 V.S.	Percentage of alkaloids by weight.
I.	0·1204 gm.	4·76	0·0253 gm.	1·204	0·203 gm.	13·44	0·0151 gm.	·812
II.	0·1186 "	—	—	1·186	·2042 "	—	—	·817

The sample of coca used was the Huanuco variety (Erythroxylon Bolivianum).

The alkaloids from Keller method were of a very dark brown color and crystallized from ether with difficulty.

It will be seen that while the Keller method does give a considerably higher result gravimetrically, it gives a much lower one by titration.

The cause of the high result of the gravimetric process of Keller is no doubt due to the fact that the light chloroform-ether mixture extracts matter soluble in the dilute acid, which the kerosene oil does not, this foreign matter again entering solution when the alkaloids are precipitated and shaken out with the heavy chloroform-ether mixture.

As a result of very many assays made during the past few years, the conclusion is reached that a leaf to be of good quality should assay by above process about 0·7 per cent. of total alkaloids.

LABORATORY OF SCHIEFFELIN & Co.,
NEW YORK.

COMMERCIAL ASAFŒTIDA.

BY M. I. WILBERT.

Asafœtida has for many years been used extensively as an antispasmodic and also with good effect as a carminative in the flatulent colic of children. In addition to this, it has been used to some

extent in the treatment of certain nervous disorders, and especially in attacks of hysteria occurring at or about the menopause.

Of late years, however, it has come into prominence on account of its value in relieving the flatulence that usually follows as a sequel to abdominal operations. The opening of the abdomen, and the necessary disarrangement of the various organs, seems to cause a suspension of the normal peristaltic action of the intestines, and the tympanites, caused by the consequent inability to expel the accumulated flatus, is the cause of much pain and discomfort to the patient. So far as known, nothing gives as prompt or as much relief as the administration of some form of asafœtida, preferably an enema or a suppository.

It follows, naturally, that the efficiency of the various preparations of asafœtida depends largely on the quality of the raw material from which they are made. Having occasion to handle a considerable amount of this gum, for the manufacture of the various preparations, the writer has at times been much perplexed by the difficulty of procuring a satisfactory supply of the crude drug. Samples of the gum have, from time to time, been compared with the Pharmacopœial requirements, and in almost every instance the amount of alcohol soluble material has fallen decidedly below that required. This fact, and the number of articles that have been published, within a year or more, in the British pharmaceutical journals, commenting on the high standard for asafœtida that has been established by the British Pharmacopœia, and the poor quality of the drug as found in the British market, has induced the writer to make a more systematic study of the available supply of asafœtida.

From correspondence with several drug houses it was learned that the price of asafœtida varied from 12 cents to $1.50 per pound, according to quality. It was also learned that the better grades of asafœtida were extremely scarce in this market, and that at the present time there was no available supply of choice select gum or tears.

The ruling prices for the gum on hand varied from 30 cents to 55 cents a pound. At the latter price a small quantity of loose tears was secured, from which sample No. 1 was subsequently selected. The sample as obtained from the jobber would not have given as favorable results, as it was freely mixed with date stones, transverse sections of roots, small pieces of stone, masses of hair,

pieces of sacking, and in addition to this, many of the tears had quite a considerable amount of coarse sand adhering to them.

Another sample, No. 10 of the annexed list, was kindly furnished from the stock of a local hospital, where it had been on hand for upward of five years. This sample was dry and hard, but, as far as foreign admixture was concerned, was not above the average.

The other specimens were samples of commercial gum, and the results of the examinations, with the prices paid or asked for the various varieties, are indicated in the annexed table:

No.	Source and Description.	Alcohol Soluble.	Insoluble.	Ash.	Price.
1	Loose tears . . . . . New York	70·1	29·9	7·2	$0.55
2	Lump . . . . . Philadelphia	44·3	55·7	34·2	.30
3	Choice gum . . . . . New York	41·4	58·6	35·8	.45
4	Mass tears . . . . . New York	36·4	63·6	45·1	.43
5	Lump . . . . . New York	31·2	68·8	51·9	.36
6	Lump . . . . . Philadelphia	30·2	69·8	50·6	.32
7	Powdered . . . . . New York	28·5	71·5	46·6	.39
8	Powdered . . . . . Philadelphia	19·8	80·2	60·6	.35
9	Soft mass . . . . . New York	18·3	81·7	62·1	.40
10	Old gum . . . . . Philadelphia	40·5	59·5	45·9	?

The method followed in making these examinations was to take 100 grammes of the drug and, after coarsely comminuting the same, placing it in an Erlenmeyer flask and adding 200 c.c. of alcohol; the mixture was then set in a warm place for three or four days and occasionally agitated. After this the dissolved portion was filtered through a double tared filter, while the residual drug was then put into a mortar and rubbed down to a paste; it was then transferred to the Erlenmeyer flask again and the mortar washed out with a sufficient quantity of alcohol, which was added to the drug; this mixture was allowed to stand in a warm place, with occasional agitation, for several days, and then transferred to the filter mentioned above. Here it was subsequently washed with warm alcohol until the washings from the filter were without odor and did not give any turbidity when added to water. The residual drug was then dried to constant weight in a drying oven and weighed. After being thoroughly mixed, 10 per cent. of this residue was taken and incinerated to obtain the proportionate amount of ash.

It may be noted that the price asked for the crude drug is not necessarily an indication of its quality. Of the eight samples that were examined, just as received from the jobber, one, the poorest (No. 9), was rather above the average in price, while the best in quality (No. 2) happens to have been the cheapest.

As might have been expected, the samples of powdered gum were rather below the average in the amount of alcohol soluble matter. Another feature of powdered gum, and a very important one, is the change that seems to be caused by the drying process; for example, the water soluble portion seems to be so altered or destroyed that it is impracticable to make the official emulsion from the powdered drug, as it will not dissolve readily in hot water.

The practice of adulterating asafœtida seems to be a very old one, and it has been the cause of much comment. Nearly fifty years ago Joseph F. Heathcote published in the AMERICAN JOURNAL OF PHARMACY an examination of powdered asafœtida, only 15 per cent. of which was soluble in alcohol. Following this there are several references to the generally poor quality of asafœtida.

In 1892 G. W. Kennedy read a paper before the Pennsylvania Pharmaceutical Association, in which he reports the examination of ten specimens of gum asafœtida, ranging in alcohol soluble matter from 29·25 per cent. to 68·80 per cent., with an average of 49·36 per cent., or a fraction below that required by the present German Pharmacopœia. Only one of the specimens came up to the requirements of the U.S.P.

Moore and Martin report (in *Chem. and Drug.*, 1899) the result of examining twelve specimens. These varied in alcohol soluble matter from 14 to 39 per cent., and the ash varied from 26 to 63 per cent. of the original weight.

J. C. Umney (*Chem. and Drug.*, 1899) also reports examining a number of samples varying in alcohol soluble matter from 21·1 to 79·8 per cent., and leaving an ash varying from 62·2 per cent. for the lower grades to 3·2 per cent. for picked tears.

Mr. Russel W. Moore (*Jour. Soc. Chem. Ind.*, 1899) gives his results of an examination of 167 samples of asafœtida known to be deficient; only six of these samples contained more than 45 per cent. of alcohol soluble matter.

The deductions to be drawn from these examinations are that the crude drug, as it occurs in this and the English markets, is grossly

adulterated, and never, or at least very seldom, complies with the requirements of the Pharmacopœias. The price asked is not necessarily an indication of the quality. Despite this variation in quality there is still a considerable amount of the drug consumed. This would indicate that it must have medicinal properties for which no substitute has as yet been found.

The continued use of the drug would also seem to require that the Pharmacopœia should in some way try to equalize the strength of the various preparations made from this drug. It might be possible, for instance, to require that the tincture should contain ten parts of the resinous material instead of, as at present, representing the soluble portion of twenty parts of the gum. The amount of drug dissolved could readily be ascertained by drying and weighing the residue left on the filter, and by subsequently diluting the alcoholic solution it could easily be made to correspond to the required standard.

The Pharmacopœia might further direct that the emulsion be made from gum, the alcohol soluble matter of which has first been ascertained.

In view of the fact that powdered asafœtida is used so extensively for pills and suppositories, and that it is very seldom or never reduced to powder by the retail pharmacist, but is always bought directly or indirectly from the drug miller, it would seem quite feasible that the Pharmacopœia include "powdered asafœtida" and require a definite amount of alcohol soluble matter, this to be low enough to prevent agglutination in warm weather, and still high enough to be of value medicinally.

CORRESPONDENCE.

PROCTER MEMORIAL.

In response to a letter from the editor of this JOURNAL concerning the most appropriate way of memorializing the life and work of Professor William Procter, Jr., the following are some of the replies which have been received:

DEAR SIR:—In reply to your kind letter of the 5th inst., it gives me great pleasure to express my high appreciation of the eminent services rendered American pharmacy by William Procter, Jr. It is my opinion that some ever fresh and ever present testimonial to his

services and memory should be instituted by the A.Ph.A., and I know of no more fitting and permanent testimonial than a beautifully executed silver medal, which is to be known as the Procter Medal, and which is to be awarded annually by the A.Ph.A. for the most meritorious service rendered pharmacy in any of its departments, the awarding to be done by the Council of the A.Ph.A., including the chairmen of the scientific, educational, commercial and practical pharmacy sections. It will thus be an honor worthy of the man whose name it bears, and its annual awarding will ever keep fresh in memory the father of our fluid extracts, the typical investigator and lover of science for science's sake, and the man who so closely approximated the ideal of his race.

ALFRED R. L. DOHME.

DEAR SIR:—Your letter of the 11th instant came duly to hand. In my opinion the most appropriate memorial would be a bust cast in bronze by a master. Copies could then be made of alabaster, of which, I am sure, every college of pharmacy at least would want one to place in its halls. Nothing in the way of a memorial would be more classic and nothing would serve the purposes of a memorial better, in my opinion. FREDERICK J. WULLING.

DEAR SIR:—Your esteemed favor of the 7th inst. was received at Detroit during my somewhat prolonged absence from the city, hence this tardy reply.

I favor the project of a properly executed monument to Prof. William Procter, Jr., in the form of a statue to be erected in some central or metropolitan city. My own choice would be Washington. The Capital is visited more extensively by travellers than is perhaps any one city in the United States, barring New York, and it abounds in beautiful statues and works of art, dedicated to the heroes of war, science and literature. The monument to Procter should be chosen with a view to its effect, not on the professional, but on the public mind—such an effect as is produced by the striking statue of Gross, which commands the entrance to the Army Medical Museum at Washington. At the present time comparatively few, even among the educated laymen, realize that pharmacy has produced its fair share of great and eminent men. A beautiful statue of Procter, suitably placed, would help to dispel the error.

JOSEPH HELFMAN.

DEAR SIR:—I have received your kind favor of the 9th inst., and I am very sorry that I did not read the editorial of last November in your esteemed JOURNAL. However, I have read the replies published in your February JOURNAL.

If William Procter, Jr., the father of American pharmacy, is to be commemorated in a befitting manner, by all means let it be a life-size statue of purest Carrara marble. And place the statue in the most conspicuous place in the country. Place it in company with the other great men of our country, whose marble statues adorn Monument Hall in the Capitol, at Washington. This would be my first choice.

As my second choice, the Procter Memorial Laboratory, at Washington, D. C., would be splendid, indeed. (Not the choice, but the laboratory.) It was a little difficult to decide first and second.

Certainly, Philadelphia has first claims on her illustrious son, but since he is a national figure, his monument should stand where the monuments of the most illustrious sons of the nation stand, and that is Washington. G. H. CHAS. KLIE.

DEAR SIR:—The suggestion of Mr. Arny is precisely that which I have had in mind. No doubt the endowment of a scholarship would be an appropriate memorial to the "Father of American Pharmacy," but gifts would not be as freely made to a scholarship connected with any particular school as they would to something in which all sections alike would feel that they had equal share.

A research laboratory is the pressing need to-day of our profession. It will cost money to build and equip such a laboratory. It seems to me that the money can be raised in no easier way than in connection with a memorial to Wm. Procter.

I believe that the laboratory may be made self-supporting from the beginning. We have at present no means of procuring such drugs as belladonna of standard strength. The consumers of such drugs would willingly pay half a cent a pound for an article accompanied with a guaranteed assay. The laboratory could furnish such certified assays for one-half that amount, so that there would be a profit to the laboratory and to the dealer. One would suppose that all pharmacists would prefer the assayed drugs and willingly pay the higher price for them. With more strict require-

ments such as the new Pharmacopœia will no doubt lay down, many will be compelled by State laws to buy the assayed drugs or else themselves assay all they buy.

The stamp of the Procter Memorial Laboratory would thus come immediately to be recognized as authoritative in connection with commercial values. Manufacturers would quickly grasp the idea that the value of their products might be also enhanced by a similar stamp of endorsement, if it should be thought wise to offer it.

In any case, I believe that it would be not too much to require that every proposed new pharmaceutical should be submitted for approval to the Memorial Laboratory, which should refuse to give countenance to anything not exactly what it was represented to be, and should moreover withhold approval from anything whose *bona fide* formula was withheld.

It would be expected that the Pharmacopœial Revision Committee would receive substantial assistance in its work by such a research laboratory, reasonable compensation being made of course for necessary expert work.

While Washington would be the ideal place for the Memorial Laboratory, it seems to me that on business considerations New York would have first claim on it. This with other details of the project may well be left open for discussion, but in my judgment a research laboratory would be the most fitting tribute we could possibly render to the memory of Professor Procter.

A. B. LYONS.

DEAR SIR:—Replying to yours of February 6th, I would say that I look upon the different plans submitted for a Procter memorial this way:

I would be decidedly in favor of a "research laboratory," provided a fund of not less than $200,000 would be raised. This, I am afraid, cannot be done.

I do not like the idea of a "scholarship," because it would be extremely difficult to select the most deserving men from the many applicants scattered through the whole United States. Scholarships should be attached to individual institutions, but I take it for granted that it is the general opinion to make this memorial one of national character.

To place a "monument," such as a bronze statue of Procter, in some public and well-chosen locality would be highly appropriate.

Yet, of all plans submitted, I favor most the proposition of Dr. Fr. Hoffmann, to found a memorial medal "to be granted in recognition of superior discoveries or literary accomplishments in the domains of theoretical and applied pharmaceutical sciences and arts."

I am also in favor of Dr. Hoffmann's plan to make this prize medal a memorial for both Procter and Squibb, naming it the "Procter-Squibb memorial prize medal."

I am inclined to think that both these men, if their opinion could be learned, would much prefer to have their names and memory perpetuated in this form, than to have monuments erected in their honor.

While these are my personal views, I desire to say that whatever may be done to do homage to the memory of our really great men will find my most hearty support. W. Simon.

Dear Sir:—I am in hearty sympathy with the movement to establish a Procter memorial as the climax of any celebration of the fiftieth anniversary of the A.Ph.A. Our Association now has a considerable fund, which was made secure a few years ago for the purpose of husbanding it for the purpose of research. With this as a nucleus it ought to be possible to erect at Washington a creditable building devoted to research, on condition that the government maintain it and support its officers. Besides having a staff of government scientists representing the principal branches of pharmaceutical science, including pharmacology, such a building could be made the home of the U.S.P. Revision Committee. One laboratory in such a building might be dedicated to Procter, another to Squibb, etc.

To have a bust made of Professor Procter, or a portrait painted or any other expression of appreciation of Professor Procter's services is a duty which the Philadelphia College of Pharmacy and its alumni owe their teacher, and in which they certainly do not need the assistance of others. A statue seems out of the question, and of pharmaceutical medals we possibly have sufficient. As a nation we cannot honor Procter or Squibb, or both, more than by the erection of a research laboratory devoted to solving problems which the Revision Committee must so largely leave unsolved.

Since writing the above suggestion, I see that Professor Arny has

made a similar one. I heartily second his suggestion, with the proviso that the American Pharmaceutical Association erect the building and turn it over to the government *on condition that the U. S. Government pledge itself to properly support it.* The co-operation of the government seems to me of the greatest importance.

EDWARD KREMERS.

RECENT LITERATURE RELATING TO PHARMACY.

WEST INDIAN SANDAL OIL.

The plant Amyris balsamifera yields an oil entering commerce as named above. This oil has specific gravity ·962, is dextrogyre and fractionates with six portions, the first fraction distilling in vacuo at 139°–147° C. and the sixth at 170°–174° C. The second and fourth fractions are most abundant, and the two analyze to $C_{15}H_{24}$ and $C_{15}H_{24}H_2O$ respectively. The oil yields with halogen acids a series of derivatives, the chlorine derivative (yield 17 per cent.) being identical with cadinene dihydrochloride, $C_{15}H_{24}2HCl$, and the other halogen derivatives being analogous cadinene compounds.—E. Daussen, *Arch. Ph.*, 1900, 144. H. V. ARNY.

SANDALWOOD OIL.

The oil of Santalum album, examined by M. Guerbet (*J. de Ph. et Ch.*, 1900, 225), has specific gravity 0·9867 and had specific rotating power — 21·16°. Saponification separated from it 3 per cent. of the following acids: Formic, acetic, santalic and teresantalic, all found in the oils as esters. Santalic acid, $C_{15}H_{24}O_2$, is a viscid, colorless liquid boiling at 210°–212° C. under 20 millimetres pressure, insoluble in water, but soluble in alcohol, and is so feebly acid that it can be freed from its salts by CO_2. Teresantalic acid, $C_{10}H_{14}O_2$, occurs in large colorless prismatic crystals melting at 157° C., and forms crystalline salts. The unsaponifiable portion of the oil yielded, on repeated fractional distillation, 6 per cent. of sesquiterpenes, santalenes α and β respectively, the former boiling at 252° C., the latter at 281°. Both are lævogyre. Also two alcohols, santalol α and β, 80 per cent., the study of which is not complete. Lastly, there was obtained from the oil by precipitation with semicarbazid hydrochlorate 3 per cent. of an aldehyde, santalol, $C_{15}H_{24}O$, a colorless liquid of peppery odor, boiling at 180° C. under 40

millimetres pressure, and forming a crystalline semicarbazone, melting at 212° C. On oxidation with chromic acid the aldehyde yielded santalic acid. H. V. A.

THE CHARACTER OF DROPS.

An interesting contribution to this subject is an article by F. Eschbaum (*Ber. Dtsch. Ph. Ges.*, 1900, 91). He gives table of weights of drops of almost every kind of liquid, and from his experiments has deduced the following equations:

(1) To secure uniform drops it is necessary that the liquid drop from a spherical surface of estimated radius. He shows that the influence of the surface of the vessel from which the liquid is dropped comes from the readiness of this surface to form a curved segment of liquid, which the investigators call the meniscus of the drop. This aggregation of liquid continues to collect on the dropping surface of the container until its adhesive power is overcome by the force of gravitation, hence the actual formation of the drop is solely influenced by cohesion and gravitating force. For instance, he finds that, taking two tubes of the same calibre, one of which is very thin walled, the thicker the wall, the larger the drop; in other words, the outer circumference of the dropping surface is the sole determinant of the size of the drop. This continues with increased circumference of tube until the maximum of a drop of water is attained. This maximum drop he finds weighs 0·2330 grammes.

(2) The weight of a drop of a mixture of two liquids is always between the weight of its two components.

(3) The weight of a drop of a solution of a solid body, such as salts, bases, acids, extractive matter, and also of a solution of a gas, is practically the same as that of its solvent. In this connection the writer discovered an interesting fact, that, usually, the weight of a drop of a saturated solution of a salt is less than that of a drop of water.

(4) That the rapidity of dropping from the same container, or variation in temperature during dropping, while exerting a certain influence, is not sufficient to be considered in practical work.

(5) The size of a drop varies according as the liquid is dropped from a full bottle or from one partially full.

Dropped from a tube of diameter 6·63 millimetres, measured from

one outer edge to the other, a drop of water weighed 0·1 gramme; a drop of alcohol, specific gravity 0·831, weighed 0·033 gramme; one drop of ether weighed 0·0238; one drop of chloroform weighed 0·0376 gramme. H. V. A.

KOLA NUT.

At a recent meeting of the German Pharmaceutical Society, the kola tree and its fruit were discussed from two standpoints by K. Schumann and by L. Bernegan. From the mass of detail the following facts were gleaned:

The fruit of kola weigh as much as 2 kilos, and since a large number of fruits are produced by one tree, its branches would be subjected to much pressure were it not for a provision of nature, namely, from the trunk spring many of the flowers (Cauliflorie), thus throwing much of the burden on the sturdy trunk. The flowers are of two kinds, in both of which the petals are missing, the calyx assuming a pink color which attracts fertilizing insects. The flowers are very odorous (vanillin-like), while the fruit smells like the Marechal Neil rose. Within the pulpy fruit four to eight seeds or nuts are found. These nuts are used by native Africans only when fresh, and large quantities are sent to the Brazilian negroes, who likewise insist on receiving undried nuts. Accordingly, they are exported to Brazil carefully packed in leaves of Cola cordifolia, and by this means the seeds can be kept four weeks. The price of the nuts ascends in proportion to distance from place of collection; for instance, at place of collection in Ashanti, 2,000 nuts cost 6 marks; in Salaga they cost 30 marks, while in Bahia, Brazil, the same quantity costs 400 to 600 marks.

The tree grows sometimes 15 metres high, begins bearing fruit in its eighth year, and bears fifty years. The wood of the branches is used by the negroes for cleaning teeth, while a decoction of young branches is used as a gargle by the negro children.—*Ber. Dtsch. Ph. Ges.*, 1900, 67. H. V. A.

PURIFICATION OF WATER.

Water can be freed of bacteria by means of minute quantities of the halogen elements, and a study of this is reported by F. Malmejac (*J. Ph. et Ch*, 1900, 364). To successive quantities of very impure water, chlorine, bromine and iodine were added, each in proportion of 0·1 milligramme to the litre. The reagent was allowed

to act half an hour and the excess removed with sodium thiosulphate. Comparison of the purified waters with the impure sample showed that, while the purification effected little change in the amount of organic matter tested with permanganate, ranging from 4·4 milligrammes per litre in the impure to 3·2 in that purified with chlorine, and also slight alteration in the amount of ammonia, ranging from 0·24 milligrammes per litre in the impure to 0·16 in the chlorinated, the destruction of bacteria was most notable, the amount in the original water counted on nutritive gelatin after eight days being 17,500 (in what quantity?—ED.); in chlorine purified water, 300; in bromine purified water, 190, and in iodine, only 90. The writer thus gives preference to alcoholic solution of iodine as a purifier. Attention is called to the fact that all the water examined developed oxygen on standing, the impure original having 9·6 milligrammes per litre after one day and 12·6 milligrammes after twenty days; the chlorinated, 11·6 milligrammes after one day and 15·3 milligrammes after twenty days. These represent the extremes.

H. V. A.

THYMOTAL.

A new remedy against *Anchylostomum duodenale.*

Thymol is known for its antiseptic properties. It is therefore administered, internally, especially against that dangerous parasite, the *Anchylostomum duodenale,* when Ext. Filicis mas æther, Pellietierin, Kamala et t. g. fail.

Anchylostomum duodenale is one of the special plagues of warm countries, especially of Italy. Italians spread it sometimes. Frequently it becomes of an epidemic character. It is one of the causes of chlorosis, and can become fatal, under certain circumstances. The "worm" reaches a length of 18 millimetres. The sexes are separate. West India is especially infested with it. How well it is provided for its deadly work can be judged from a drawing made by Professor Leuckardt, reproduced in "Practisch wichtige microscopische Objecten," page 298 of Hager-Mez' "Das Microscop," Berlin, Julius Springer, 1899.

The administration of thymol has bad after-effects; it causes dizziness, intoxication, nausea.

Applying the same process whereby guajacol loses its strongly aromatic and burning taste, becomes tasteless, but preserves its medical properties, *e. g.*, converting it into a carbonate.[1] Mr. J. F.

[1] E. Schmidt, "Ausf. Lehrb. d. Pharm. Ch.," II, page 938.

Pohl, apothecary at Paramaribo, states that he succeeded in converting thymol into thymol carbonate, a nearly tasteless, colorless, crystalline compound, varying but little in its melting point from thymol (thymol, 50°–51°; thymol carbonate, 49°; details were not given as to how this estimation was made), but considerable in its boiling-point (thymol, 230°; thymol carbonate, "over" 400°).

This new remedy is not dissolved in the stomach; causes, therefore, no dizziness nor nausea, and is very effective against those intestinal pests where Ext. Filix mas. cannot be taken.

We regret to state that Mr. Pohl has added to our already unbearable burden of new remedial names another name; has put a mysterious shroud around it and called the compound thymotal, wherefore he cannot show a good cause of doing this.

The remedy has the usual support of half a dozen doctors.

J. B. NAGELVOORT.

THEOBROMA CACAO.

Th. Peckolt's "Medicinal and Useful Plants of Brazil," which appeared in the *Berichte der deutschen Pharmaceutische Gesellschaft*, opens a new chapter in botanical materia medica, and it is to be hoped that the articles will be gathered into one volume.

From the closing article the following data on Theobroma Cacao is gleaned:

The seeds were not used by the native Brazilians until after the advent of the Europeans, the natives employing only the sweetish pulp, from which they fermented a beverage. Since the seeds were used by the Mexicans and Peruvians from primeval days, there is evidently no ethnological connection between the west coast Indians and those of Brazil.

The tree is considerably cultivated at the present time, for, by reason of the low price brought by coffee and the expense of its culture, many planters are turning to cacao, 600 trees on a hectare (2½ acres) of ground bearing, after five years, 4,500 to 4,800 kilos dried seed each year. The frequency of crop and size of seed depend on climatic conditions, in hot places two crops a year being the rule. In Cantagallo the average fruit weighed 220 grammes and yielded 27·5 grammes dried seed; while in Rio—a warmer place—the fruit averaged 330 grammes, divided as follows: Rind,

204 grammes; pulp, 36 grammes; seed, 90 grammes, which dried to 48·6 grammes.

The rind yielded fat, resin, albumen, tannin, glucose, mucilage (4 per cent.), water (81 per cent.), ash (2 per cent.) and theobromine (0·6 per cent.).

The mucilage makes the rind a valuable substitute for ground flaxseed, which spoils very quickly in Brazil. It is also of use as fodder.

The pulp contains tartaric acid (1 per cent.), glucose (3·8 per cent.), albumen (0·5 per cent.), mucilage (1 per cent.), pectin and extractive (7 per cent.), ash (1 per cent.). The alcoholic liquor produced from it is very palatable and ferments to a good vinegar.

The fresh seeds contain water (46 per cent.), fat (17 per cent.), theobromine (0·2 per cent.) and ash (1·25 per cent.).

The fresh leaves contain water, fatty oil, resin, theobromine (0·07 per cent.), tannin, extractive and 0·2 per cent. of a substance tasting like glycyrrhizin and resembling it in analytical reactions.

H. V. A.

FORMATION OF CINCHONA ALKALOIDS.

Believing that the alkaloids were developed in the leaves, just as is starch, Dr. J. P. Lotsy experimented at the Java governmental cinchona plantations as follows: Leaves were divided at the midrib, the half with midrib being either left on tree or immersed in water, the two halves being assayed at different times, control experiments having shown that the two halves of the same leaf, examined at the same time, yielded approximately the same amount alkaloids. In some cases the half first examined was rich in alkaloids, while the half left on the tree was, within twelve hours, free from alkaloids. That this disappearance was due to migration of the alkaloids into the bark and not to dissociation of same by leaf processes was shown by the fact that, if the remaining half were removed from tree, the diminution of alkaloidal strength was never observed; but, on the contrary, a leaf originally free from alkaloids developed same on exposure to light after being removed from tree. This is of importance, because, while some experiments showed the emptying of alkaloids from a leaf within twelve hours, in other cases, twelve hours after the first half showed no alkaloids, the second half yielded a considerable quantity.

The percentage of alkaloids in young succirubra leaves is ten times greater than that of the old leaves, but the actual amount in each leaf is not as great. The average tree, having 10,000 leaves weighing about 5 kilos when dried and yielding about $\frac{1}{10}$ per cent. alkaloids a day, produces about 2 kilos of alkaloids a year (5 grammes a day), a quantity much greater than that obtained each year from the bark of an average tree. This shows the leaves fully capable of producing all the alkaloids we find. The excess in formation is easily accounted for: (1) The leaves are never completely emptied each day. (2) The unfavorable weather reduces alkaloidal output.

The theory of leaf formation of alkaloids is strengthened by the facts that the petioles are richer in alkaloids than the blade, that the branch bark contains more than the trunk bark, that the root bark is practically free from alkaloids. The leaves, however, contain no crystalline alkaloids, hence no quinine. This is explained by saying that the leaves produce a fundamental and soluble alkaloidal base, which is elaborated into the true alkaloids when being stored in the bark.—*Ber. dtsch. Ph. Ges.*, 1900, 124.

H. V. A.

ASSAY OF VOLATILE OIL IN AROMATICS.

Distil an alcoholic percolate of the drug with steam, taking care that distillate represents an aliquot part of the drug. Place 100 c.c. of this distillate, to which a few drops of diluted sulphuric acid is added, and which must not contain more than 50 per cent. of alcohol, in a special flask, having a lower bulb of 95 c.c. capacity connected by a narrow neck, graduated from 98 c.c. to 100 c.c. in fractions of 05 c.c., to a second bulb holding 25 c.c. up to its neck, which in turn connects with a third bulb of value in agitation. The liquid in the flask is cooled in water to exactly 20° C. and an exact reading is taken, after which petroleum ether (sp. gr. 0·640 to 0·670) of same temperature is added up to the 125 c.c. mark. In this way the flask contains two distinct layers of liquid, say the aqueous up to 100 c.c. and the benzin up to 125 c.c. The mixture is vigorously shaken five minutes and then allowed to cool to 20° C., when it is noticed that the oil formerly present in the aqueous layer has been absorbed by the benzin, increasing volume of the latter the amount of oil present, as proven by experiments of the author. —Dr. Neuman Wender, *Ph. Post.*, 1900, 344. H. V. A.

THE ETHER TEST FOR SCAMMONY.

Of two consignments of the same scammony sent from Beyrouth in Syria—one to Germany, the other to France—the former was returned as not standing the ether solubility test of the pharmacopœia, while the French specimen was found perfectly satisfactory. This led P. Guigues (*J. de Ch. et Ph.*, 1900, 529) to investigate, and he found the cause of the contradictory reports in the variable quality of commercial ether; even that labelled "pure." He finds many of the most reliable ethers contain water, even to 1·60 per cent., and the slightest trace renders scammony insoluble. Most contain alcohol, which renders the resin easily soluble even when water is present in the solvent. Another curious point is that in some cases the resin dissolves freely in a certain quantity of ether and precipitates when excess of the solvent is added. From these several facts the writer concluded that the test should be carefully studied and revised, with special reference to quality and quantity of the ether employed. H. V. A.

PHENYLHYDRAZINE REACTION FOR URINE.

The difficulties of above test, which is most valuable for detecting minute quantities of urine, can be obviated as follows: Put in ordinary test-tube equal amounts (about size of a pea) of phenylhydrazin, HCl, and crystallized sodium acetate. Fill tube with the urine and cork, not allowing finger to come in contact with the phenylhydrazin, which is a dangerous poison to the blood. Shake the mixture till the salts are dissolved, then remove stopper, place tube in boiling water, immediately removing flame. Allow the test-tube to remain in the water till completely cold, preferably over night; then remove precipitate with pipette and examine microscopically. The crystals rarely appear as striking as pictured in the books, but the presence of sugar can be safely established if the precipitate is intensely yellow and crystalline. By this means 0·01 per cent. sugar can be detected. Practice is essential to diagnosis, hence the beginner is urged to first experiment with urine to which glucose has been added.—Dr. F. Eschbaum, *Schw. Woch. f. Ch. und Ph.*, 1900, 214. H. V. A.

EDITORIAL.

PARLIAMENTARY LAW IN ASSOCIATIONS.

At the different association meetings there are many members who are more anxious for the good of their professions than are conversant with parliamentary law. The result is that when the presiding officer is more or less familiar with the law and anxious to carry out the law these members who are making motions and amendments contrary to such laws sometimes find that they are declared to be out of order; and hence are inclined to consider such rulings to be unjust and not in accord with the good of the cause they are expounding.

There are very few presiding officers of professional bodies who are thoroughly conversant with parliamentary law and able to carry on a meeting in the proper way. This arises because the presiding officers are usually selected on account of their scientific or literary attainments—as they undoubtedly should be—and not because of their being good parliamentarians. It is true that, as a rule, at the meetings of professional bodies no serious difficulties confront the chair. However, difficulties do arise and chairmen sometimes lose their heads, and things are sometimes said and done which are unwise and unfortunate, but which fortunately are usually expunged from the records and not published.

Observations on the actions of various bodies show that each body should have a presiding officer to direct its business affairs who is familiar not only with the needs of the body, but who is also a good parliamentarian. Professor Lloyd, when President of the American Pharmaceutical Association (Proceedings, 1888, p. 15), made the following recommendation, which is deserving the consideration of all associations, as it would tend unquestionably to facilitate the business of the organizations and permit the ablest men to be selected for the most honorable positions of these associations, and who are not then burdened with the difficulties of presiding at all the meetings.

Professor Lloyd says: "Sometimes it may be desirable to elect as your president a man totally inadequate in the direction of parliamentary tactics, and of little value as a presiding officer. Whatever good reason may induce such a selection, I think that it will not be disputed that it is necessary to always have an accomplished

parliamentarian as presiding officer, in order to facilitate the work of the organization. I can refer to this matter graciously, for I reflect my own shortcomings in doing so. The good judgment of this Association wisely associated with me a superior parliamentarian, capable, willing, obliging, and I thank you for the consideration shown me; but especially am I indebted to this gentleman, Mr. M. W. Alexander, who has so discreetly and acceptably conducted your meetings.

"I believe that it would be well to honor such men and serve yourselves by extending them lengthened positions in presiding over us, and create in our body a new office, a presiding chairman, who can both preside over the general meeting and fill vacancies in the absence of the chairmen of the sections.

"The President elected by reason of a special fitness for other labors will then have time to attend to his peculiar duties; he may appoint committees, etc., etc., during your meetings without the distractions attending the chairmanship; the conducting officer, elected by you at stated periods because he is really capable of being a parliamentarian, will conduct your deliberations in a proper manner. He will become acquainted with faces, names and methods, and facilitate the order of your meetings. * * * * I will admit that some of our Presidents are capable parliamentarians, but it is sometimes desirable to elect men without such accomplishments. In support of this opinion, since writing this section, I have reviewed an editorial article by Dr. Fred. Hoffmann on the subject in the *Pharmaceutische Rundschau* (September, 1885), and extract the following sentence: 'A thorough familiarity with the subject matters of the deliberations, and the rare gift of wise tact, of quick and good judgment, and of energy, are requisites for managing large conventions with success.' If men with these talents and ability, and with comprehensive knowledge, can be placed, or have been found, at the helm of the association, it certainly would be conducive to the best interests and efficiency of its annual meetings to retain them. If it is not considered advisable to add this new officer, I strongly urge that the Vice-Presidents be selected for the purpose of filling this position, and that the President-elect be relieved from the detail work of conducting the meeting, giving his entire attention to the real work of his office."

The mode of procedure in selecting the presiding officers in the

American Association for the Advancement of Science is one which commends itself to all professional organizations, as it tends to relieve the President of performing more than one series of duties each year. The President is elected at one meeting, presides at the following meeting and delivers his presidential address the next succeeding year. This, however, does not do away with the necessity of his presiding at one of the meetings, and, should he not be a parliamentarian or desire to qualify himself as such, places him in an unpleasant position.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the forty-eighth annual meeting, held at Richmond, Va., May, 1900. Baltimore: 1900.

A succinct account of the Richmond meeting of the American Pharmaceutical Association has already been given the readers of this JOURNAL (see Vol. LXXII, p. 291). The full account of the meeting, with papers and discussions as well as a number of addresses, is given in 344 pages of the proceedings just published. In 517 pages is given the report on the progress of pharmacy, from July 1, 1899, to June 30, 1900. The remainder of the proceedings is devoted to a list of members, constitution and by-laws and other matters of interest to members. There are few, if any, associations in which the members receive greater value from their membership than that of the American Pharmaceutical Association. From the viewpoint of a business transaction, it is one of the best investments the apothecary can make.

INORGANIC GENERAL MEDICAL AND PHARMACEUTICAL CHEMISTRY. Theoretical and Practical. A Text-Book and Laboratory Manual, containing Theoretical, Descriptive and Technological Chemistry; Class Exercises in Chemical Equations and Mathematics; and Practical Manufacturing Processes for Five Hundred Chemical Preparations, with Explanatory Notes. By Oscar Oldberg. In two volumes. Chicago: Chicago Medical Book Company. 1900.

For the student who desires to get at the fundamental principles underlying theoretical chemistry, the work of Professor Oldberg will be a decided help. The language is succinct, clear and to

the point. The author treats well of such important subjects as the atomic theory; chemical polarity; the relative intensity of the chemical energy of different elements; atomic valence; chemical notation and nomenclature; the laws and conditions which dominate the course of chemical reactions; oxidation and reduction; the periodicity of the properties of the elements; the intimate relations of all these to each other and to atomic mass; and their bearings upon the practical problems of chemical work. There are also included adequate instruction, rules and examples, designed to enable the student to fully master the all-important practical uses of chemical equations and mathematics, seven chapters being devoted to these subjects.

Volume I is divided into three parts and includes chapters on the following subjects: Part I. Elementary Theoretical Chemistry: (1) Introductory, Some Common Kinds of Matter; (2) Atoms, Molecules and Chemism; (3) Preliminary Experiments Showing Physical Signs of Chemical Action; (4) The Chemical Elements; (5) The Law of Definite Combining Proportions and the Atomic Theory; (6) Chemical Polarity; (7) The Relative Intensity of the Chemical Energy of the Elements; (8) Atomic Valence; (9) Atomic Polarity-Value; (10) Chemical Notation; (11) Chemical Nomenclature; (12) Classification of Chemical Compounds—Binary Compounds; (13) Hydroxides, Acids and Bases; (14) Salts; (15) The Relations of Oxides, Acids, Bases and Salts to Each Other; (16) Structure of the Metallic Oxygen-Salts of the Common Acids; (17) Chemical Reactions; (18) Oxidation and Reduction; (19) The Forces and Conditions which Dominate the Course of Chemical Reactions; (20) How to Write and Balance Ordinary Chemical Equations; (21) How to Balance Equations Representing Reactions of Oxidation and Reduction; (22, 23, 24) Examples in Oxidation and Reduction; (25) Atomic Polarity-Value as an Aid to the Verification of the Structure of Molecules; (26) The Periodicity of Properties of the Elements; (27) A Recapitulation of Fundamental Facts, Definitions and Hypotheses.

Part II. Elementary Descriptive Chemistry: (28) Order of Study of the Elements and their Compounds; (29–67) The Elements and their Compounds, including the Ammonium Compounds and Metallic Salts of the Organic Acids. Part III. (68, 69) Stoechiometry.

The contents of the second volume include:

Part I. General Principles and Methods Applicable in the Production of Inorganic Chemical Preparations: (1) Choice of Methods and Materials; (2) Crushing and Powdering; (3) Dry Chemical Processes; (4) Solution: Its Nature, Causes and Effects; (5) Solvents, Solubility, Solutions; (6) The Clarification of Liquids, Strainers, Presses, Filtration; (7) Evaporation; (8) Distillation; (9) Crystals and Crystallization; (10) Crystallizations from Solutions; (11) Dialysis; (12) Precipitation; (13) Chemical Solution, Wet Oxidation, Wet Gas Operations; (14) Uses of Unfinished Products; Purification of Crude Chemicals. What to do with Damaged Products. Profitable Chemical Work; (15) The Preservation of Medicinal Substances; (16) Solubilities of Chemical Compounds in Water and in Alcohol; (17) The Densities of Solids and Liquids. The Mohr-Westphal Balance; Hydrometers; Pycnometers, etc.; (18) Rules for Making Solutions of any Given Strength, and for Diluting, Fortifying and Mixing; (19) Laboratory Furniture and Apparatus; (20) Laboratory Rules and Precautions; What to do in Accidents; How to Clean Apparatus. Part II. Laboratory Manual of Inorganic Chemical Preparations: Introductory; Weights and Measures; Water; Acids; Other Preparations; Tables; Index.

The chapters on Chemical Polarity, Atomic Valence and Atomic Polarity-Value, in Book I, are particularly valuable. The application of atomic valence in balancing equations is of great value, particularly in the consideration of oxidation equations. It is doubtful if there are any formulæ or reactions which are not in agreement with the doctrine that no atom can gain increased combining value except at the expense of some other atom or atoms and that the gain and the loss exactly balance each other. The consideration of the nature of atoms underlies the whole superstructure of practical chemistry. Part I is based on the most advanced chemical theories, and the author has wisely devoted over 300 pages in the consideration of the fundamental matters connected with theoretical chemistry. The remainder of Part I is given to the consideration of the elements and the stoechiometry of inorganic chemistry. Volume II is devoted to the consideration of actual laboratory operations in the production of inorganic chemicals and the making of 500 inorganic chemical preparations. The author has shown an assimilation of the subject matter and an originality of treatment

that is pleasing, and there can be no question but that students, investigators and manufacturers will find that these volumes contain just such information as is frequently lacking in many of the text and reference books on this subject.

KING'S AMERICAN DISPENSATORY. New edition. Entirely rewritten and enlarged. By Harvey W. Felter and John Uri Lloyd. Two-volume edition, royal octavo, containing together 2,284 pages, including complete indices. Cloth, $4.50 per volume, postpaid. Sheep, $5 per volume, postpaid. The Ohio Valley Company, publishers, Cincinnati, O.

Volume I of this work appeared in 1898 and a brief mention of it was made in this JOURNAL, 1898, p. 580. Volume I includes substances from A–G and contains 904 pages. Volume II includes substances from G–Z inclusive and contains 1,267 pages. Volume II is an improvement over Volume I in editorial work as well as in the use of paper and typographical work. The treatment of the eclectic materia medica is the best part of the book, and it is in this particular field that the work is a valuable contribution to materia medica. The student and investigator who is anxious to know more about the possibilities of the cultivation of medicinal plants in America will find numerous valuable hints, as under podophyllum: "May-apple is hardy and will thrive in fence corners of cultivated fields, often resisting the advances of agricultural improvements, when other common fence-weeds have been exterminated. It is not, as is the case with many other valuable medicinal plants, likely to be soon eradicated." Under hydrastis we read: "With hydrastis, however, the opposite is true; the plant disappears as soon as the ground is disturbed by the settler." There are many things recorded that one would have difficulty in ascertaining, as literature is so scattered and references become more and more difficult to look up. The new edition of King's Dispensatory will be much appreciated by those who have been anxiously waiting its appearance and it will prove a valuable adjunct to the reference library of the physician and pharmacist.

CINCHONA BARKS OF THE NEW YORK MARKET was the subject of a paper by J. H. Stallman at an evening meeting at the College of Pharmacy of the city of New York on January 15th. The paper was discussed by Professor H. H. Rusby, well known for his studies on cinchona, coca and other vegetable drugs, and Adolph Henning.

PHARMACEUTICAL MEETING.

The fifth of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901 was held Tuesday, February 19th. Theodore Campbell, a local pharmacist and a member of the College, presided.

The first speaker was Dr. Wm. C. Alpers, of New York City, who is well known for his active interest in pharmaceutical matters in general. Before taking up the main topic of his paper, Dr. Alpers said, in referring to the oft-repeated statement that pharmacy is not in a satisfactory condition, that if any advancement is to be made, the impetus must come from the colleges of pharmacy. He therefore urged the students who were present to strive to make the most of their opportunities while in college and to strive for high ideals. He said that there is something greater than pennies, that knowledge is a greater and nobler capital than dollars and cents. It is a capital which neither sickness nor misfortune can take away. He said he had little respect for the man who stoops to the gutter to find a penny, but high regard for the man who looks up to the stars for his ideals.

Then taking up the subject of his paper, which was entitled "Remarks on a New Cold Cream and Other Ointments," the speaker gave a practical demonstration of his method of procedure (see page 117). One point which was brought out by the speaker and which he especially emphasized was that of using chemical thermometers for operations requiring heat, this being a point that is too often neglected by pharmacists.

In reply to a question by Wallace Procter as to whether cold cream made by the proposed formula retains the water better than the official ointment, Dr. Alpers said that, so far as his knowledge went, it did, his experience having been with samples only a year old, which as pointed out had kept perfectly.

F. W. E. Stedem said that his only criticism on the official cold cream was the presence of borax, which interfered with its use as a basis for mercurial salts.

E. M. Boring also remarked upon this point and said that he invariably omitted the borax. His method of procedure is to melt together the spermaceti, white wax and expressed oil of almond, and to allow to cool over night, the rose water being incorporated

the next day. Mr. Boring also said that he endeavored to keep his ointments in a cool place in summer and that he did not experience much difficulty in keeping them. Continuing his remarks, Mr. Boring said that until comparatively recently paraffin had not been favorably considered as a basis for ointments containing active ingredients, but that Wilbert had shown that by incorporating a considerable portion of water with the ointment base this difficulty was overcome. This point, he said, took his memory back to war times when the Government rejected a considerable quantity of paraffin on account of its rancidity.

Remarking on this point, Dr. Alpers said that of course it must be borne in mind that a much purer article is obtainable now.

With regard to the presence of borax in the formula proposed by him, Dr. Alpers said it was desirable to retain it, as it assisted in the mixing of the two solutions and also added to the appearance of the finished preparation.

Mr. Campbell said that he had been using a formula somewhat similar to the one given by Mr. Alpers and that it yielded a satisfactory preparation.

M. I. Wilbert read a paper on "Oxygenated Petrolatum," and gave a practical demonstration of its mode of preparation. In the first step certain proportions of paraffin oil and oleic acid are mixed together, the resultant solution being of a cloudy appearance; and to this, spirit of ammonia is added when the solution clears up. This solution acts as a solvent for many medicinal substances such as camphor, salol, phenol, creosote, ichthyol, etc., and is especially adapted for use in liniments. It furnishes an ideal solvent for iodine, as it prevents the iodine from evaporating, also facilitates its absorption, and may be applied several times a day without producing blistering effects.

Replying to a query as to a rise of temperature when iodine is added to the preparation, Mr. Wilbert said that it was very slight.

A very interesting and suggestive paper on "Why Do Syrups Spoil?" by Alfred I. Cohn, New York City, was presented in abstract on behalf of the author by Prof. Henry Kraemer (see page 119).

The next speaker introduced was Wm. R. Lamar, of New York City, who read a paper on "Assay of Coca" (see page 125).

Prof. Jos. P. Remington said that he was pleased that Mr. Lamar had taken up this subject, as the Pharmacopœial Revision Com-

mittee desires to have work of this kind, as there is an evident need for standardized drugs. He said that ten years ago there was a cry for standardized preparations, but that the committee found difficulty in adopting methods which could be utilized by the pharmacist as well as by their originators.

Dr. Alpers said that he was also much interested in the subject of the paper. He said that a number of years ago he had tried a number of assay processes using various solvents. He asked whether by the use of kerosene for extracting coca there was any trouble from the introduction of higher paraffin oils, as this appears to be a rather variable article, having different flashing points in different states. In reply, Mr. Lamar said that he had had no trouble in this respect, that he used an ordinary 150 test oil.

Professor Remington spoke of the small percentage of alkaloid in the drug, and referred to the question of the importation of crude cocaine into this country for the manufacture of the alkaloid. Mr. Lamar spoke on the tariff regulations and said that there was a duty on both the purified and crude alkaloid, and that on account of the heavy duty on the latter, only a limited quantity is imported. He also said that the crude article (alkaloid) contained a very small percentage of the true alkaloid.

Dr. C. B. Lowe referred to some assay experiments which Dr. Rusby had made some years ago in South America, which led to the belief that a larger percentage of alkaloid could be obtained from leaves which were comparatively fresh.

Lyman F. Kebler said that he had examined a sample of the crude alkaloid which assayed 96 per cent., and that he knew of one manufacturing firm which used this article exclusively for the manufacture of their cocaine.

Mr. Lamar said that the problem of the purity was an important one and that the question to be determined was whether the alkaloid in question was pure or whether it contained by-products. His experience had been that it contained a number of impurities.

Dr. H. C. C. Maisch presented a paper on "Gum Mastic," which will appear in a later issue of this JOURNAL. The author, having a sample of mastic submitted to him which was very light in color, and suspecting that it was a substitution product, submitted it to a comparative test with other commercial samples, and it was found that they were all identical.

In discussing this paper Professor Lowe referred to the history of mastic, stating that it was of great interest, and, to a large extent, that of the island of Scio, from which the drug comes.

He said that in the fourteenth century a Genoese family by the name of Laccaria obtained a concession from one of the Greek emperors (to whom the island was then tributary), and settled there, being joined by many of the nobles of Genoa, who relinquished their family names, taking the general name of Ginstiniani, and forming a society called the Mano. This company, which was somewhat like the former East India Company, taking advantage of the weakness of the emperor, declared themselves independent and governed the island to suit themselves, making their own laws, coining their own money and fighting their own battles. The island was held by this company with somewhat varying fortunes for some 250 years, when it was conquered by the Turks, who hold it to this day.

When under the control of the Mano, the annual revenue from mastic amounted to the large sum (for those days) of about $69,000.

Mr. Kebler submitted a sample of the drug which he said was whiter than the specimens accompanying the paper. He said the statement in the U. S. P. about it being brittle will not hold. He further remarked that he did not attach as much importance to the acid number as is ordinarily done, but still he was in favor of using every available method.

In speaking of the use of mastic in medicine, Jos. W. England said that mastic was used in connection with aloin in the Lady Webster pill, to retard the action of the aloin until it reaches the intestines.

Mr. Kebler remarked, in connection with the subject of indicators, that distilled water frequently gives an alkaline indication with cochineal, and on this account causes a variation in the assay figures in titrating for alkaloids.

The same speaker then called attention to the impurity of the gum arabic on the market, and said that he had a great deal of difficulty in obtaining a pure article. Aqueous solutions of samples which he had examined had a reducing action on Fehling's solution. He said that, of course, it is admitted that inferior grades do this, that is, they contain some sugar which reduces the copper solution.

Mr. Lamar exhibited an ebulliscope, an instrument of French

manufacture, which is used extensively for determining the percentage of alcohol in wines and liquors. He said that concordant results could be obtained with it, and in this respect was more satisfactory than some of the other methods which are used. In order to show the comparative accuracy of the method, he gave the following data: In one case an alcohol which had a specific gravity of ·9867 as determined by Squibb's specific gravity bottle, this being equivalent to 10·08 per cent. by volume, gave a percentage of 9·7 per cent. by volume with the ebulliscope, a difference of ·38 per cent. A second sample contained 19·34 per cent. by volume according to the Squibb apparatus, and with the ebulliscope, 19·7 per cent. by volume, these figures representing extremes of variation.

Mr. Procter, having tried the use of paraffin for denarcotizing opium as suggested by Gordon (AMER. JOUR. PHARM., 1900, p. 576), exhibited a specimen of the residual paraffin which was considerably colored. The resulting tincture was re-paraffined, but the second product was similar in appearance to the first.

A vote of thanks was tendered the authors of the papers for their presentation.

At the next meeting, on Tuesday, March 19, Prof. Virgil Coblentz, of the College of Pharmacy of the City of New York, will give a lecture on "Recent Developments in the Study of the Relationship between Chemical Constitution and Physiological Action of Organic Compounds."

FLORENCE YAPLE,
Secretary pro tem.

NOTES AND NEWS.

COMMERCIAL PHARMACY will receive attention at the hands of a number of competent lecturers at the University of Michigan on each Wednesday, from February 13th to May 29th, inclusive.

LEHN AND FINK, whose establishment in New York City was burned out recently, are temporarily located at 77–79 Beekman Street, and expect to occupy their new building at 120 William Street by March 1st.

A NEW RESEARCH LABORATORY.—The twentieth century will no doubt be a century of progress in applied science, and one of the developments will be the research laboratory, where investigators will carry on researches which have practical objects in view. Parke, Davis & Co. intend to build an elaborate science laboratory which will be devoted exclusively to research work in chemical and biological directions.